AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

Claim 1 (Canceled).

2. (Previously Presented) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, said control-program-development supporting apparatus comprising:

a compiler which compiles the control program into codes directly executable by a microprocessor that includes at least one cache; and

an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes, recombining logical operations, and rearranging codes for locally arranging instructions for a common input or output device before the control program is compiled by the compiler, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

Claims 3 and 4 (Canceled).

5. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, said control-program-development supporting apparatus comprising:

a control-program dividing unit which divides the control program into blocks, each block including at least one rung; ~~and~~

a compiler which compiles at least some of the blocks into execution codes directly executable by a programmable controller, wherein the programmable controller includes a microprocessor having pipeline logic; and

an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes, recombining logical operations, and rearranging codes for locally arranging instructions for a common input or output device before the control program is compiled by the compiler, wherein

a control program optimized by said optimization filtering unit is newly used as the control program, and

the microprocessor includes pipeline logic and a cache.

Claim 6 (Canceled).

7. (Previously Presented) The control-program-development supporting apparatus according to claim 5, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into blocks, each block including at least one rung at a predetermined rung in the ladder diagram to generate a program file for every block concerned.

8. (Previously Presented) The control-program-development supporting apparatus according to claim 5, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into blocks, each block including at least one rung at a predetermined rung serving as a jump destination for a jump instruction in the ladder diagram to generate a program file for every block.

9. (Previously Presented) The control-program-development supporting apparatus according to claim 5, wherein

the control program is a ladder diagram or an instruction list generated from the ladder diagram, and

the control-program dividing unit extracts at least some rungs including instructions to a common input or output device from the ladder diagram, at least some of the rungs extracted constituting one controllable block, and generates a program file for every block.

Claim 10 (Canceled).

11. (Previously Presented) The control-program-development supporting apparatus according to claim 5, further comprising a processing-time rough-estimating unit which has a relating table which relates sample program having known processing times with the control program corresponding to the execution codes to estimate a sequential-processing execution time of a programmable controller in

accordance with the relating table, wherein the processing-time rough-estimating unit determines and selects the sample program most similar to the control program to estimate processing time.

12. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, said control-program-development supporting apparatus comprising:

a control-program dividing unit which divides the control program into blocks, each block including at least one rung;

a control-program converting unit which converts at least some of the blocks into high-level-language control programs described with a computer-readable high-level language for every block; ~~and~~

a compiler which compiles at least some of computer-readable high-level programming languages corresponding to every block into codes directly executable by a programmable controller; and

an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes, recombining logical operations, and rearranging codes for locally arranging instructions for a common input or output device before the control program is compiled by the compiler, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

Claim 13 (Canceled).

14. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein

the control program is a ladder diagram or an instruction list generated from the ladder diagram, and

the control-program dividing unit divides the control program into blocks, each block including at least one rung at a predetermined rung in the ladder diagram to generate a program file for every block.

15. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into blocks, each block including at least one

rung at a predetermined rung, serving as a jump destination for a jump instruction in the ladder diagram, to generate a program file for every block.

16. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein

the control program is a ladder diagram or an instruction list generated from the ladder diagram, and

the control-program dividing unit extracts at least some of rungs including instructions to a common input or output device from the ladder diagram, constituting one controllable block of at least some of the extracted rungs, and generates a program file for every block.

Claim 17 (Canceled).

18. (Previously Presented) The control-program-development supporting apparatus according to claim 12, further comprising a processing-time rough-estimating unit which has a relating table which relates sample programs having processing times already known with the control program corresponding to the execution codes to estimate a sequential-processing execution time of a programmable controller in accordance with the relating table, wherein the processing-time rough-estimating unit determines and selects the sample program most similar to the control program to estimate processing time.

Claims 19-25 (Canceled).

26. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a microprocessor including pipeline logic and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language, the control-program-development supporting apparatus having

a control-program dividing unit which divides the control program into blocks, each block including at least one rung;~~ and~~

a compiler which compiles at least some of the blocks into execution codes directly executable by a programmable controller; and

an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes, recombining logical operations, and rearranging codes for locally arranging instructions for a common input or output device before the control program is compiled by the compiler, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

27. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a microprocessor including pipeline logic and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program, described with a sequential-control language, the control-program-development supporting apparatus having

a control-program dividing unit which divides the control-program into blocks, each block including at least one rung;

a control-program converting unit which converts at least some of the blocks into high-level-language control programs described with a computer-readable high-level language for every block; ~~and~~

a compiler which compiles at least some of computer-readable high-level programming languages corresponding to every block into codes directly executable by a programmable controller; and.

an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes, recombining logical operations, and rearranging codes for locally arranging instructions for a common input or output device before the control program is compiled by the compiler, wherein a control program optimized by said optimization filtering unit is newly used as the control program

Claims 28-37 (Canceled).